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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/085,052	03/01/2002	Tatsuhiro Okada	0234-0442P	8158
2292	7590	07/16/2004	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			DOVE, TRACY MAE	
			ART UNIT	PAPER NUMBER

1745

DATE MAILED: 07/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/085,052	OKADA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Tracy Dove	1745	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

This Office is in response to the amendment filed on 4/16/04 and the supplemental amendment filed on 4/27/04. Applicant's arguments have been considered, but do not place to application in condition for allowance. Claims 1 and 3-21 are pending. Claim 2 has been canceled. This Action is made **FINAL**, as necessitated by amendment.

#### ***Double Patenting***

The double patenting rejection has been withdrawn. A proper terminal disclaimer was filed on 4/16/04.

#### ***Claim Objections***

Claim 1 is objected to because of the following informalities: the claim recites "wherein the polymer electrolyte membrane prevents fuel or air inside from leaking". Examiner suggests "wherein the polymer electrolyte membrane prevents fuel or air on the inner side of the membrane from leaking". Appropriate correction is required.

The term "type" in claims 11 and 21 is objected to. Examiner suggests deleting the term "type" from claim 11 and 21 to clarify the subject matter claimed.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 12 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a fuel cell comprising a tubular polymer electrolyte membrane, does not reasonably provide enablement for a fuel cell comprising a tube and a separate tubular polymer

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electrolyte membrane. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. The claims recite two components for the fuel cell, “a tube” and “a tubular polymer electrolyte membrane”. The specification does not enable a fuel cell having the two components. The specification uses the term “tube” to refer to or describe the tubular polymer electrolyte membrane.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim recites “a tube” in line 1. It is unclear what the term “a tube” encompasses because the claim also recites “a tubular polymer electrolyte membrane”. The specification uses the term “tube” to refer to or describe the tubular polymer electrolyte membrane.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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Claims 1, 3-6, 8-16 and 18-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Bass et al., US 6,001,500.

Bass teaches a cylindrical (tubular) fuel cell comprising an anode containing an anode catalyst, a polymer electrolyte membrane and a cathode containing a cathode catalyst. The polymer electrolyte is between the anode and the cathode (abstract). The anode and cathode are gas diffusion electrodes preferably comprising carbon materials such as graphite, carbon fiber and carbon cloth (col. 2, lines 30-46). Catalyst particles are deposited onto the electrode surface and the particles may be a noble metal catalyst on carbon (col. 2, line 66-col. 3, line 3). The catalyst material is applied to the outside of the inner electrode (contacts polymer electrolyte) (col. 3, lines 28-33). The electrode and catalyst material may be applied directly to the membrane (col. 5, lines 5-7). Hydrogen gas contacts the anode (fuel electrode) and oxygen gas contacts the cathode (air electrode) (col. 8, lines 1-15). Each fuel cell is assembled using five layers (col. 4, lines 6-52). Figure 2 shows the cathode is provided on the outer surface of the membrane and the anode is provided on the inner surface of the membrane. The membrane has an inner diameter of up to about 2.16 mm and a thickness of 0.13 mm or less. The thickness is preferably about 0.09 mm (outer diameter of the membrane is  $2.16+0.09=2.25$  mm). Table 1 teaches the polymer electrolyte membrane fuel cell has a length of 25 cm (250 mm). The fuel cell may be used as a source of power for transportation (col. 1, lines 18-19).

Thus the claims are anticipated.

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Claims 13, 14, 16-18, 20 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Muthuswamy et al., US 6,060,188.

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Muthuswamy teaches a cylindrical fuel cell having a cathode 23, a cathode catalytic layer 24, a polymer electrolyte 25, an anode catalytic layer 26 and an anode 27 (abstract). The anode is located on the outer side of the membrane and the cathode is located on the inner side of the membrane (Figure 2). Alternatively, the anode 37 may be located on the inner side of the membrane and the cathode 33 located on the outer side of the membrane (Figure 3). The catalyst layer is present on the side of an electrode that faces the electrolyte. Oxidant is evenly distributed to the cathode and fuel is allowed to pass to the anode (col. 3, lines 52-67). Methanol may be used as the fuel (4:17-20) and the membrane may be a perfluorosulfonic acid material (3:38-51).

Thus the claims are anticipated.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bass et al., US 6,001,500 in view of Muthuswamy et al., US 6,060,188.

See discussion of Bass above regarding claims 1, 3-6, 8-16 and 18-21.

Bass does not explicitly state the fuel electrode is provided on the outer side of the membrane and the air electrode is provided on the inner side of the membrane.

However, Muthuswamy teaches a cylindrical fuel cell having a cathode 23, a cathode catalytic layer 24, a polymer electrolyte 25, an anode catalytic layer 26 and an anode 27

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(abstract). The anode is located on the outer side of the membrane and the cathode is located on the inner side of the membrane (Figure 2). Alternatively, the anode 37 may be located on the inner side of the membrane and the cathode 33 located on the outer side of the membrane (Figure 3). The catalyst layer is present on the side of an electrode that faces the electrolyte. Oxidant is evenly distributed to the cathode and fuel is allowed to pass to the anode (col. 3, lines 52-67). Methanol may be used as the fuel (4:17-20) and the membrane may be a perfluorosulfonic acid material (3:38-51).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Muthuswamy teaches it is known in the art that tubular fuel cells may have the anode located on the outer side of the membrane and the cathode located on the inner side of the membrane or, alternatively, the anode located on the inner side of the membrane and the cathode located on the outer side of the membrane. Specifically, Muthuswamy teaches the electrodes may be located on either side of the membrane. One of skill would have been motivated by the teachings of Muthuswamy to provide the anode on the outer side of the membrane and the cathode on the inner side of the membrane because Muthuswamy teaches fuel cells are known to have this configuration. Both Bass and Muthuswamy are directed toward tubular/cylindrical fuel cells.

#### ***Response to Arguments***

Applicant's arguments filed 4/16/04 and 4/27/04 have been fully considered but they are not persuasive.

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Bass '500

Applicant argues Bass does not teach a “carbon particle electrode”, but instead discloses “carbon rods”. Examiner points out Figure 2 which shows a gas diffusion anode 36 comprising carbon black loaded with platinum black catalyst. Gas diffusion anode 36 is not in the form of a rod. The carbon black/platinum is doped into a carbon cloth. Thus, Bass teaches the electrode may comprise materials other than a carbon rod. The cathode layer 40 is formed in the same manner as the anode layer 36 (4:14-25 and 43-47). Furthermore, Bass teaches carbon rods or carbon powders (particles) are preferred material (6:19-26). Applicant discusses catalytic activity and high pressure resistance, however, the claims do not contain any limitations regarding catalytic activity or high pressure resistance. Limitations from the disclosure are not read into the claims. Applicant refers to “a hollow and flexible space”, however, the claims do not contain any limitations requiring a hollow and flexible space. Specifically, the claims require only a tubular membrane. The claims do not require a tubular fuel or air electrode (hollow inside) on the inner side of the membrane.

Regarding the discussion of generated heat and method of preparation, the claims do not contain any limitations regarding generation of heat and/or method of forming the fuel cell limitations. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Note the claims do not contain any limitations regarding a



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platinum catalyst. Furthermore, evidence of unexpected results cannot be used to overcome a 35 U.S.C. 102(b) rejection.

Muthuswamy '188

The rejection of claims 1, 3, 4 and 6-8 as being anticipated by Muthuswamy is withdrawn. Claim 2, not rejected, has been incorporated into claim 1.

Regarding claims 13, 14, 16-18, 20 and 21, Muthuswamy does not teach a solid rigid central core as the electrode. As shown in Figure 2, the core is 22, the cathode is 23 and the anode is 27. The core 22 is porous and provides a base to fabricate the fuel cell around. Figure 3 does not even illustrate a central core, but contains a hollow chamber 38. Thus, Applicant's argument is not persuasive. Regarding the discussion of catalytic activity, generated heat and method of preparation, the claims do not contain any limitations regarding catalytic activity, generation of heat and/or method of forming the fuel cell limitations. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Furthermore, evidence of unexpected results cannot be used to overcome a 35 U.S.C. 102(b) rejection.

Tanaka 2002/0076586

The rejection of claims 1-6 and 8 as being anticipated by Tanaka is withdrawn. A certified translation of the priority document disclosing the claimed invention has been provided. Tanaka is no longer available as prior art against the claimed invention.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

July 14, 2004



**Patrick Ryan**  
**Supervisory Patent Examiner**  
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